A LLAMA FROM THE PLEISTOCENE OF McKITTRICK, CALIFORNIA.

By John C. Merriam and Chester Stock.

INTRODUCTION.

In a provisional list of mammals from an asphalt deposit occurring near McKittrick,[1] Kern County, California, a slender-limbed camel was recognized as certainly distinct from the large *Camelops hesternus* known from Rancho La Brea. Since the preliminary account of the McKittrick asphalt deposit and fauna, further excavating at this locality has resulted in the collection of additional material of the small camel as well as of specimens of a type resembling closely the species *Camelops hesternus*. The slender-limbed camel is undoubtedly closely related to the living llama of South America, and, since this records, for the first time, the presence of the genus *Lama* in the Pleistocene of California, if not in that of North America,[2] a preliminary statement regarding the form seems desirable, in advance of a complete survey of the McKittrick mammalian assemblage now in progress. The authors appreciate the courtesy of officials of the Midway Royal Petroleum Company for extension of excavation privileges.

Lama stevensi, n. sp.

Type specimen.—A fragmentary mandible with lower dentition, No. 24260 Mus. Pale., Univ. of Calif., from Locality 4096, McKittrick, California. Named for Mr. J. B. Stevens, who brought the McKittrick deposit to the attention of the University of California.

Specific characters.—Type approaching in size the existing llama. Lower molars with enamel of internal faces not as distinctly folded as in existing llama. $M\bar{1}$ with median external style. $M\bar{2}$ and $M\bar{3}$ with antero-external style not as well developed as in *Lama*. Posterior or third lobe in $M\bar{3}$ not separated from second lobe as distinctly as in the corresponding tooth of the Recent *Lama*.

The material on which the present description is based consists of fragments of several mandibles and parts of the upper and lower dentition. While the collection unfortunately does not exhibit the important structures of the cranium, the remains of the lower jaw and of the dentition yield on study important data of use in the determination of the form.

The species from the McKittrick Pleistocene approaches in size the existing South American llama and may be found to average larger than this form. *Lama stevensi* is

[1] J. C. Merriam and C. Stock, Occurrence of Pleistocene vertebrates in an asphalt deposit near McKittrick, California. Science, n. s., vol. 54, pp. 566–567, 1921.

[2] J. W. Gidley, records a llama from deposits of late Tertiary or Pleistocene age in San Pedro Valley, Arizona. (See J. W. Gidley, Preliminary report on fossil vertebrates of the San Pedro Valley, Arizona, with descriptions of new species of Rodentia and Lagomorpha, U. S. Geol. Surv., Prof. Paper 131, pp. 119–131, plates 34, 35, 1922.)

considerably smaller and less robust than *Camelops hesternus* (Leidy). In the mandible of the type specimen, No. 24260, figures 1 and 2, the vertical portion of the ramus is largely lacking. In the horizontal ramus the inferior border is practically straight in its extent from a point below $M\bar{3}$ to the symphysis. The symphyseal region is relatively longer and more slender than in the Recent *Lama*. The anterior mental foramen is large and is situated behind the inferior canine, while the posterior foramen is situated below the middle of $P\bar{4}$.

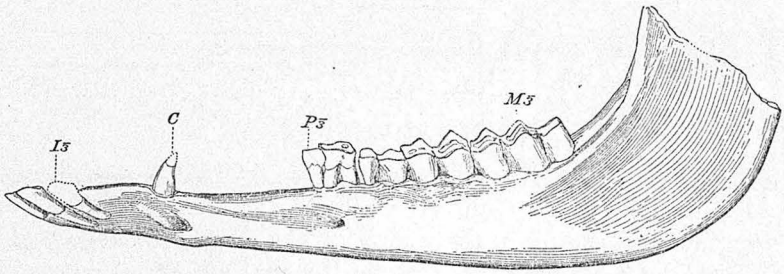

FIG. 1.

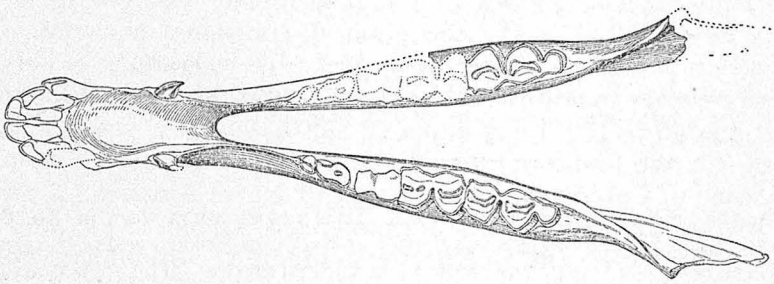

FIG. 2.

FIGS. 1 and 2.—*Lama stevensi*, n. sp. Mandible No. 24260, Mus. Pale., Univ. of Calif. × 0.33. Fig. 1, lateral view; fig. 2, superior view. McKittrick Pleistocene.

Judging from the material available, the Pleistocene species was characterized by a dental formula similar to that in the Recent llama. In the type specimen, $P\bar{3}$ is present, while in No. 24258 from McKittrick the tooth is absent. The corresponding tooth has not been noted in specimens of *Camelops hesternus* from Rancho La Brea.

An upper series of teeth, $P\underline{3}$ to $M\underline{3}$ inclusive, No. 24259, of *L. stevensi* is shown in figure 3. $P\underline{3}$ possesses a rather simple crown which closely resembles that in the corresponding tooth of *Lama*. A rudimentary fold of enamel extends inward from each end of the outer crest, but these folds do not meet in median line. The folds are better developed than in $P\underline{3}$ of *Camelops hesternus*. The middle internal root of this tooth may be united with both external, anterior and posterior, roots. In $P\underline{4}$ of No. 24259 the external enamel surface is folded not quite so strongly as in the existing llama. The superior molars exhibit less folding of the external enamel surface and the parastyle and mesostyle are less prominent in these teeth than in the living species.

The lower incisors are relatively small. The lower canine approximates in size the tooth in the living llama, but the crown of the tooth appears to be less curved. $P\bar{3}$, present in No. 24260, is supported on a single root, and has a simple crown consisting of a single cusp compressed transversely. $P\bar{4}$ resembles that in *Lama*, but the anterior portion of the internal surface is apparently not so deeply infolded as in the latter form. In the slightly worn tooth, present in No. 24258, figure 4, a deep infolding of the enamel occurs on the posterior side, while in the specimen showing greater wear, No. 24260, this is replaced by a very small enamel lake.

The inner surface of the lower molars is noticeably less folded than in the existing llama. Each of the molar teeth in No. 24258 possesses a buttress or style at the outer forward end of the antero-external crescent, but this structure is not as prominent as in the living *Lama*. The style is not clearly seen in the molars of No. 24260, figure 1, because of the worn condition of these teeth. Merriam [1] states that this style is absent in $M\underline{2}$ and $M\underline{3}$ of *Camelops hesternus*.

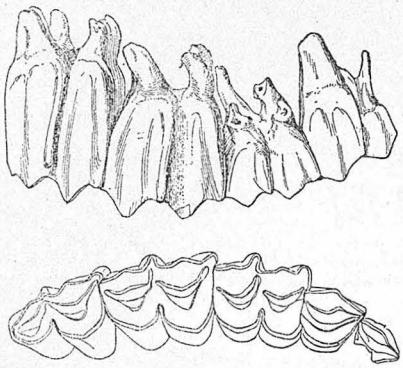

FIG. 3.

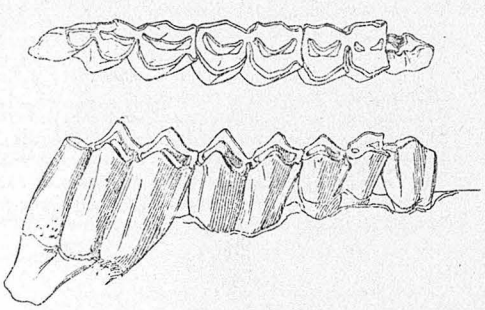

FIG. 4.

FIG. 3.—*Lama stevensi*, n. sp. Superior dentition, No. 24259, Mus. Pale., Univ. of Calif., lateral and occlusal views, × 0.50. McKittrick Pleistocene.

FIG. 4.—*Lama stevensi*, n. sp. Inferior dentition, No. 24258, Mus. Pale., Univ. of Calif., occlusal and lateral views, × 0.50. McKittrick Pleistocene.

$M\underline{1}$ in the type specimen is well worn. It is not so much worn in No. 24258. In this specimen $M\underline{1}$ exhibits a distinct style at the outer forward end of the postero-external crescent, just behind the median longitudinal groove. This style is absent in $M\underline{1}$ of the one specimen of the Recent llama available for comparison. The style is also absent in $M\underline{1}$ of *Camelops hesternus*. In $M\underline{3}$ the third or posterior lobe has a relative size comparable to that in living species. The inner surface of this lobe is not so distinctly set off from that of the second lobe as in the Recent *Lama*.

Measurements (in millimeters) of mandible, No. 24260.

Length of symphysis (approximate)	63
Least width behind inferior canine	27.8
Greatest height below anterior border of $P\underline{4}$	27
Greatest height below posterior border of $M\underline{3}$	51
Distance from posterior side of lower canine to anterior side of $P\underline{4}$ (approximate)	57

Measurements (in millimeters) of superior dentition, No. 24259.

$P\underline{3}$, greatest antero-posterior diameter (taken at base of crown)	13
$P\underline{3}$, greatest transverse diameter (taken at base of crown)	8.8
$P\underline{4}$, greatest antero-posterior diameter	16.6
$P\underline{4}$, greatest transverse diameter	13.2
$M\underline{1}$, greatest antero-posterior diameter	25.8
$M\underline{1}$, greatest transverse diameter	21.5
$M\underline{2}$, greatest antero-posterior diameter	32.3
$M\underline{2}$, greatest transverse diameter	19.6
$M\underline{3}$, greatest antero-posterior diameter	28.2
$M\underline{3}$, greatest transverse diameter	17.1
Length from anterior side of $P\underline{3}$ to posterior side of $M\underline{3}$	104.3

[1] J. C. Merriam, The skull and dentition of a camel from the Pleistocene of Rancho La Brea, Univ. Calif. Publ., Bull. Dept. Geol., vol. 7, No. 14, p. 315, 1913.

Measurements (in millimeters) of inferior dentition.

	No. 24260	No. 24258
$I\bar{1}$, transverse diameter	9.5	
$I\bar{2}$, transverse diameter	8.7	
$I\bar{3}$, transverse diameter	8.5	
Lower canine, antero-posterior diameter	8.7	
$P\bar{3}$, greatest antero-posterior diameter	9	
$P\bar{3}$, greatest transverse diameter	4.3	
$P\bar{4}$, greatest antero-posterior diameter	14.7	13.9
$P\bar{4}$, greatest transverse diameter	9.2	8.5
$M\bar{1}$, greatest antero-posterior diameter	18.8	21.3
$M\bar{1}$, greatest transverse diameter	13.1	14.6
$M\bar{2}$, greatest antero posterior diameter	26.2	27.8
$M\bar{2}$, greatest transverse diameter	17	15
$M\bar{3}$, greatest antero-posterior diameter	36.6	34.7
$M\bar{3}$, greatest transverse diameter	16.1	14.8
Length from anterior side of $P\bar{3}$ to posterior side of $M\bar{3}$	101.7	
Length from anterior side of $P\bar{4}$ to posterior side of $M\bar{3}$	95.3	98
Length from anterior side of lower canine to posterior side of $M\bar{3}$	*a* 161	
Length from anterior side of $I\bar{3}$ to posterior side of $M\bar{3}$	*a* 222	

a Approximate.